 we build energy.		PVSYST V6.42	Gräss Engineering GmbH (Germany)		01/03/16	Page 1/5
Weissenhorner Str. 26 - 89347 - Bubesheim - Germany						
Grid-Connected System: Simulation parameters						
Project :		Test Varianten Maharashtra				
Geographical Site		Maharashtra			Country	India
Situation		Latitude	19.6°N	Longitude	76.1°E	
Time defined as		Legal Time	Time zone UT+5.5	Altitude	491 m	
		Albedo	0.20			
Meteo data:		Maharashtra MeteoNorm 7.1 - Synthetic				
Simulation variant :		1 Achs M				
		Simulation date	01/03/16 15h18			
Simulation parameters						
Tracking plane, tilted Axis		Axis Tilt	0°	Axis Azimuth	0°	
Rotation Limitations		Minimum Phi	-40°	Maximum Phi	40°	
Backtracking strategy		Tracker Spacing	17.5 m	Collector width	6.70 m	
Inactive band		Left	0.20 m	Right	0.20 m	
Models used		Transposition	Perez	Diffuse	Perez, Meteonorm	
Horizon		Free Horizon				
Near Shadings		According to strings		Electrical effect	100 %	
PV Array Characteristics						
PV module		Si-poly	Model	Sunmodule Plus SW 255 poly		
Original PVsyst database		Manufacturer	SolarWorld			
Number of PV modules		In series	24 modules	In parallel	100 strings	
Total number of PV modules		Nb. modules	2400	Unit Nom. Power	255 Wp	
Array global power		Nominal (STC)	612 kWp	At operating cond.	547 kWp (50°C)	
Array operating characteristics (50°C)		U mpp	656 V	I mpp	835 A	
Total area		Module area	4024 m²			
Inverter						
Custom parameters definition		Model	blueplanet 50.0 TL3			
Characteristics		Manufacturer	KACO new energy			
		Operating Voltage	580-900 V	Unit Nom. Power	50 kWac	
Inverter pack		Nb. of inverters	10 units	Total Power	500 kWac	
PV Array loss factors						
Array Soiling Losses			Loss Fraction	1.0 %		
Thermal Loss factor		Uc (const)	29.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s	
Wiring Ohmic Loss		Global array res.	1.8 mOhm	Loss Fraction	0.2 % at STC	
LID - Light Induced Degradation				Loss Fraction	0.6 %	
Module Quality Loss				Loss Fraction	-0.5 %	
Module Mismatch Losses				Loss Fraction	1.0 % at MPP	
Incidence effect, ASHRAE parametrization		IAM =	1 - bo (1/cos i - 1)	bo Param.	0.05	
System loss factors						
AC wire loss inverter to transfo		Inverter voltage	400 Vac tri			
		Wires: 3x1200.0 mm²	305 m	Loss Fraction	1.8 % at STC	
External transformer		Iron loss (24H connexion)	602 W	Loss Fraction	0.1 % at STC	
		Resistive/Inductive losses	2.7 mOhm	Loss Fraction	1.0 % at STC	

Grid-Connected System: Simulation parameters (continued)

User's needs : Unlimited load (grid)

Grid-Connected System: Near shading definition

Project : Test Varianten Maharashtra

Simulation variant : 1 Achs M

Main system parameters

System type **Grid-Connected**

Near Shadings

PV Field Orientation

According to strings
tracking, tilted axis, Axis Tilt

PV modules

Model

PV Array

Nb. of modules

Inverter

Model

Inverter pack

Nb. of units

User's needs

Unlimited load (grid)

Electrical effect 100 %

Axis Azimuth 0°

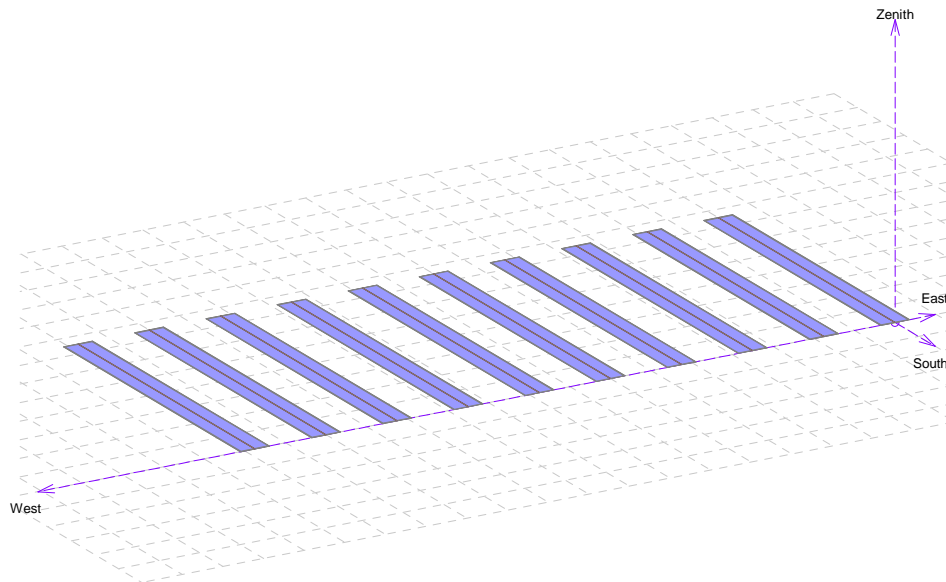
Sunmodule Plus SW 255 poly 255 Wp

Pnom total **612 kWp**

Pnom 50.0 kW ac

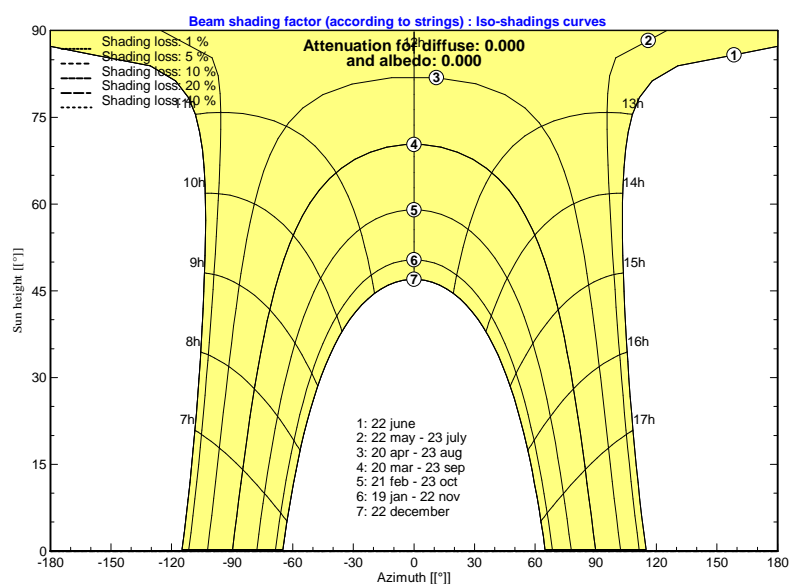
Pnom total **500 kW ac**

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Test Varianten MSolar Time



Grid-Connected System: Main results

Project : Test Varianten Maharashtra

Simulation variant : 1 Achs M

Main system parameters

System type **Grid-Connected**

Near Shadings

PV Field Orientation

PV modules

PV Array

Inverter

Inverter pack

User's needs

According to strings

tracking, tilted axis, Axis Tilt

Model

Nb. of modules

Model

Nb. of units

Unlimited load (grid)

Electrical effect 100 %

Axis Azimuth 0°

Sunmodule Plus SW 255 poly 255 Wp

Pnom total **612 kWp**

Pnom 50.0 kW ac

Pnom total **500 kW ac**

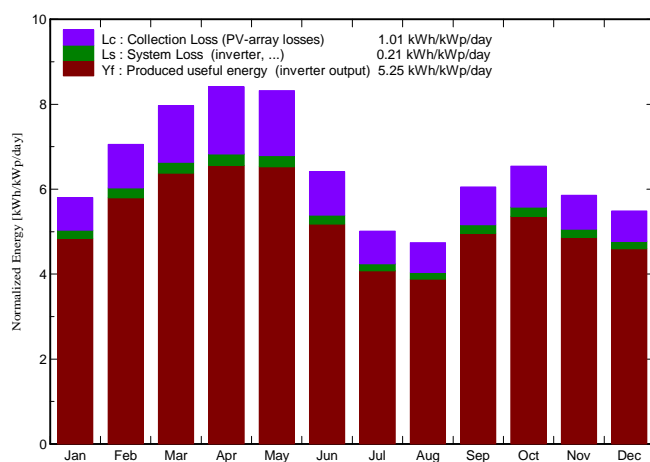
Main simulation results

System Production

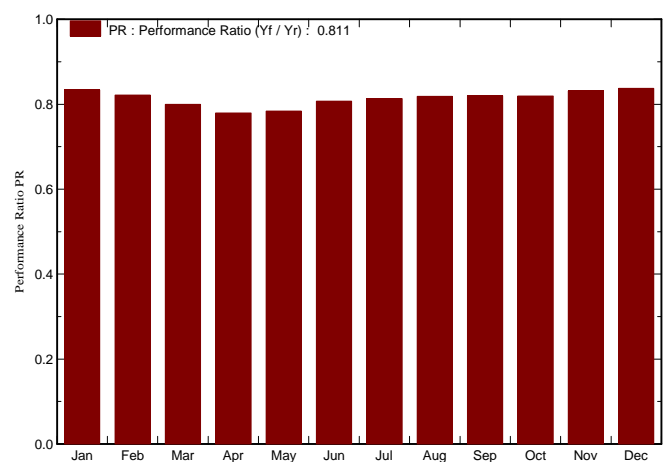
Produced Energy 1172 MWh/year
Performance Ratio PR 81.1 %

Specific prod. 1915 kWh/kWp/year

Normalized productions (per installed kWp): Nominal power 612 kWp



Performance Ratio PR



1 Achs M

Balances and main results

	GlobHor	T Amb	GlobInc	GlobEff	EArray	E_Grid	EffArrR	EffSysR
	kWh/m ²	°C	kWh/m ²	kWh/m ²	MWh	MWh	%	%
January	141.2	21.30	180.0	171.0	95.5	91.8	13.19	12.68
February	154.0	24.10	197.6	188.5	103.4	99.4	13.00	12.50
March	194.7	28.30	247.1	236.3	125.9	120.9	12.66	12.16
April	201.5	31.60	252.4	242.0	125.4	120.4	12.35	11.85
May	208.2	32.40	258.0	246.4	128.9	123.8	12.41	11.93
June	163.1	28.00	192.4	182.1	98.9	95.1	12.77	12.28
July	133.3	26.10	155.4	146.7	80.6	77.4	12.88	12.37
August	130.9	24.80	147.0	138.1	76.6	73.6	12.96	12.45
September	150.0	25.20	181.6	172.2	94.9	91.1	12.98	12.47
October	162.0	25.20	202.9	192.9	105.8	101.7	12.96	12.46
November	139.6	22.80	175.6	166.6	92.9	89.3	13.14	12.64
December	134.0	21.09	170.1	161.2	90.7	87.2	13.25	12.74
Year	1912.5	25.91	2360.1	2244.1	1219.3	1171.7	12.84	12.34

Legends: GlobHor

Horizontal global irradiation

T Amb

Ambient Temperature

GlobInc

Global incident in coll. plane

GlobEff

Effective Global, corr. for IAM and shadings

EArray

Effective energy at the output of the array

E_Grid

Energy injected into grid

EffArrR

Effic. Eout array / rough area

EffSysR

Effic. Eout system / rough area

Grid-Connected System: Loss diagram

Project : Test Varianten Maharashtra

Simulation variant : 1 Achs M

Main system parameters

System type **Grid-Connected**

Near Shadings

PV Field Orientation

PV modules

PV Array

Inverter

Inverter pack

User's needs

According to strings

tracking, tilted axis, Axis Tilt

Model

Nb. of modules

Model

Nb. of units

Unlimited load (grid)

Electrical effect

Axis Azimuth

Sunmodule Plus SW

Pnom total

Pnom

Pnom total

100 %

0°

255 Wp

612 kWp

50.0 kW ac

500 kW ac

Loss diagram over the whole year

